



Physical Literacy of Elementy School Students in Rembang District: A Comparative Study Based on Teacher Certification Status

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Abstract:

This study describes the physical literacy level of elementary school students and examines differences based on PE teacher certification status in Rembang District. Addressing the physical literacy crisis in the digital era requires quality PE teaching. An explanatory quantitative comparative design was applied to 700 students (grades IV–VI) from 25 schools (508 taught by certified teachers; 192 by non-certified teachers), drawn from a population of 2,800 students across 35 schools. Data were collected with an adapted Physical Literacy Questionnaire and analyzed using descriptive statistics, Shapiro–Wilk normality test, Levene’s test, and independent-samples t-test. Overall physical literacy was categorized as Good, with 82% of students in Good to Excellent ranges ($t(699) = 21.1$, $p < 0.001$, Cohen’s $d = 0.798$). No significant difference appeared between students of certified and non-certified teachers ($t(698) = 0.759$, $p = 0.448$, Cohen’s $d = 0.064$). Certification status is therefore not the primary determinant; teaching experience, teacher dedication, and school facilities appear more influential.

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Introduction (مقدمة)

Physical literacy has become a central pillar of modern physical education and public-health thinking. The construct is defined as the motivation, confidence, physical competence, knowledge, and understanding that allow an individual to value and take responsibility for engagement in physical activity across the life course (Whitehead, 2010). On a global scale the urgency of promoting physical literacy is heightened by the prevalence of sedentary lifestyles among children. The World Health Organization estimates that more than four-fifths of school-aged adolescents worldwide fall short of recommended daily activity levels. National surveys in Indonesia likewise document downward trends in fitness and active participation, indicating that limited movement awareness constitutes a genuine physical-literacy crisis rather than a simple fitness shortfall.

Contemporary elementary-school pupils grow up in a digital environment that severely restricts opportunities for spontaneous active play. Heavy reliance on handheld devices and shrinking outdoor spaces hinder the natural acquisition of fundamental movement patterns—locomotor, non-locomotor, and manipulative. If the resulting low physical literacy remains unaddressed, long-term consequences are likely to include elevated childhood obesity, delayed motor development, diminished mental health, and reduced academic motivation. Field observations in Rembang District already reveal a visible shift from physical games toward screen-based entertainment, threatening the formation of a healthy and active generation.

Within this context the school system, and especially the subject of Physical Education, Sports and Health (PJOK), occupies a strategic position as the principal agent of intervention. The PE teacher is not merely a sports coach but a facilitator charged with cultivating physical literacy in its cognitive, affective, and psychomotor dimensions. Teacher competence—understood as the integrated possession of pedagogical, professional, social, and personal capacities—has traditionally been presumed to stand in a linear relationship with student learning outcomes. Certified teachers are assumed to have passed national professional standards and therefore to possess superior methodological knowledge and readiness, which should, in theory, produce higher levels of student physical literacy.

Empirical evidence, however, presents a more nuanced picture. Cairney and colleagues (2019) demonstrated that specialized PE teacher preparation is associated with greater student participation, yet other investigations have found that certification status does not invariably translate into improved movement quality. Declines in instructional motivation after certification and persistent facility limitations frequently intervene. A pronounced research gap persists in the Indonesian literature: most previous studies have concentrated on physical-fitness test batteries and have paid scant attention to the affective and cognitive components of physical literacy. Moreover, comparative examinations that directly contrast student physical literacy according to teacher certification status in semi-rural sub-districts such as Rembang remain scarce.

The present investigation therefore set out to (1) describe the overall level of physical literacy among elementary students in Rembang District across the domains of knowledge, motivation, confidence, movement skill and activity participation, and (2) determine whether that level differs significantly between students taught by certified PE teachers and those taught by non-certified teachers. Results are intended to supply local education offices, PE teacher working groups and policy makers with empirical guidance for designing professional-development programs and for refining PE curricula that place physical literacy at the center.



Method (منهج)

The study adopted an explanatory quantitative approach with a comparative design. Data collection took place in Rembang District, Rembang Regency, Central Java, between April and June 2026. The accessible population consisted of approximately 2,800 students in grades IV–VI attending 35 elementary schools that employed permanent PE teachers. A proportional random sample of 700 students was obtained from 25 schools: 508 students instructed by certified teachers and 192 students instructed by non-certified teachers.

The primary instrument was an adapted Physical Literacy Questionnaire that had undergone content validation and cultural adaptation for Indonesian elementary-school settings. The questionnaire comprises 22 closed-ended Likert items scaled from 1 (strongly disagree) to 5

(strongly agree). The items are organized into six interrelated dimensions: (1) knowledge of basic anatomy and physiology, (2) understanding of physical activity and its benefits, (3) fundamental movement skills, (4) active-lifestyle habits, (5) awareness of injury risks and prevention, and (6) motivation together with positive attitudes toward physical activity. Raw total scores ranging from 22 to 110 were linearly transformed onto a 22–88 scale to facilitate categorical interpretation. Cut-off intervals were defined as follows: 22.00–35.20 (very low), 35.21–48.40 (low), 48.41–61.60 (moderate), 61.61–74.80 (high/ good), and 74.81–88.00 (very high/ excellent). Teacher certification status was ascertained from official Ministry of Education and Culture records (Dapodik). Limited non-participant observation of PE lessons supplied supplementary contextual information.

Descriptive statistics—means, standard deviations, medians, frequencies and category percentages—were computed to characterize the physical-literacy profile of the sample. Prior to inferential testing, distributional assumptions were examined through skewness and kurtosis coefficients (acceptable range ± 1 , ratio $< \pm 2$) and through Levene's test of homogeneity of variance. A one-sample t-test evaluated whether the overall mean significantly exceeded the midpoint of the “good” category ($\mu = 62$). An independent-samples t-test compared mean physical-literacy scores of the two teacher-status groups. All statistical procedures were executed with the jamovi software package, version 2.6.

Result (نتائج)

The final analytic sample of 700 students was composed of 508 learners (72.6 %) taught by certified PE teachers and 192 learners (27.4 %) taught by non-certified PE teachers. Category-wise distribution of total physical-literacy scores revealed that 250 students (35.7 %) scored in the Excellent range, 324 students (46.3 %) in the Good range, 124 students (17.7 %) in the Moderate range, and only 2 students (0.3 %) in the Low range. Consequently, 82 % of the participants achieved Good or Excellent standing. Mean scores increased monotonically across the ordered categories (Excellent $M = 79.3$, $SD = 5.08$; Good $M = 66.1$, $SD = 2.79$; Moderate $M = 57.2$, $SD = 2.34$; Low $M = 46.5$, $SD = 3.54$), confirming internal consistency of the classification scheme.

Table 1. Distribution of Physical Literacy Categories (N = 700)

Category	n	%	Mean	Median	SD
Excellent	250	35.7	79.3	79.0	5.08
Good	324	46.3	66.1	66.0	2.79
Moderate	124	17.7	57.2	57.5	2.34
Low	2	0.3	46.5	46.5	3.54

A one-sample t-test against the criterion value of 62 produced a statistically significant result: $t(699) = 21.1$, $p < 0.001$, mean difference = 7.19, Cohen's $d = 0.798$. The large effect size indicates that the elevation of the sample mean above the “good” midpoint is not only statistically reliable but also practically substantial. Hypothesis 1, asserting that overall physical literacy resides in the Good category, was therefore retained.

Descriptive comparison of the two teacher-status groups showed nearly identical means: non-certified $M = 69.6$ ($SD = 8.87$, median = 68.0) and certified $M = 69.0$ ($SD = 9.07$, median = 67.0). Skewness and kurtosis values for both groups fell well within the acceptable range, supporting the normality assumption. Levene's test confirmed homogeneity of variance ($F = 0.056$, $p = 0.813$). The subsequent independent-samples t-test yielded $t(698) = 0.759$, $p = 0.448$, and a trivial effect size (Cohen's $d = 0.064$). Hypothesis 2, predicting a significant difference favoring

the certified-teacher group, was therefore rejected.

Table 2. Group Means and Independent-Samples t-Test Results

Teacher Status	n	Mean	SD	t (df)	p / d
Non-certified	192	69.6	8.87	0.759	0.448
Certified	508	69.0	9.07	(698)	0.064



Discussion (مناقشة)

The observation that more than four-fifths of elementary students in Rembang District attained Good or Excellent physical literacy is consistent with the theoretical proposition advanced by Whitehead (2010) that well-structured physical-education experiences can successfully cultivate the multi-dimensional construct. The large effect size obtained in the one-sample test further demonstrates that the elevation above the criterion value is educationally meaningful. Parallel high proportions have been reported in jurisdictions where PE instruction is delivered with sustained pedagogical intentionality (Cairney et al., 2019). The contrast with lower prevalence rates documented in certain urban Indonesian samples and in selected international cohorts suggests that the instructional climate and resource configuration currently present in Rembang may be comparatively supportive of physical-literacy development.

Equally noteworthy is the absence of a statistically or practically significant difference between students of certified and non-certified teachers. This outcome challenges the conventional assumption that formal certification status functions as a decisive determinant of physical-literacy outcomes. The finding resonates with a growing body of literature indicating that certification, once teachers are embedded in daily classroom routines, does not automatically guarantee superior instructional quality. Accumulated teaching experience, personal professional commitment, the availability of adequate equipment and outdoor space, and the broader school culture appear to exert stronger influence. The trivial magnitude of the observed effect size reinforces the conclusion that any numerical discrepancy between the two groups is negligible for practical purposes.

Several mechanisms may account for the null difference. First, national certification programs have historically emphasized administrative and general pedagogical requirements more heavily than domain-specific physical-literacy pedagogy. Second, many non-certified teachers in the district possess substantial years of classroom experience and may compensate for the lack of formal credentials through practical expertise. Third, shared constraints—limited facilities, large class sizes, and similar curricular mandates—may equalize instructional opportunities across certification categories. Collectively these considerations imply that policy and professional-development initiatives should look beyond certification alone. Continuous, literacy-focused in-service training, collaborative lesson study within PE teacher working groups, and equitable provision of facilities are more likely to produce measurable gains in student physical literacy.

The cross-sectional comparative design employed here precludes causal inference. Future research employing longitudinal or quasi-experimental designs would be better positioned to disentangle the relative contributions of certification status, teaching experience, and school-level resources. Nonetheless, the present evidence already supplies a clear practical message: elevating physical literacy among elementary students in Rembang District will require multi-faceted support for all PE teachers rather than exclusive reliance on formal certification pathways



Conclusion (خاتمة)

Physical literacy among elementary-school students in Rembang District is situated in the Good category, with 82 % of learners achieving Good or Excellent standing. No statistically or practically significant difference exists between the physical-literacy scores of students taught by certified PE teachers and those taught by non-certified PE teachers. Certification status therefore does not emerge as the primary determinant of student physical literacy; factors such as teaching experience, teacher dedication and school facilities appear more consequential. Education authorities and school leaders are encouraged to invest in sustained professional development centered on physical-literacy pedagogy and to ensure adequate instructional resources for every PE teacher, irrespective of formal certification status.

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